



Department of Transportation

National Highway Traffic Safety Administration

[Docket No. NHTSA-2010-0160; Notice 2]

Volvo Trucks North America and Mack Trucks, Inc., Grant of
Petition for Decision of Inconsequential Noncompliance

AGENCY: National Highway Traffic Safety Administration

ACTION: Notice of Petition Grant

SUMMARY: North American Trucks (NAT) on behalf of Volvo Trucks North America (VTN) and Mack Trucks, Inc. (MTI)¹ has determined that certain 2008 through 2010 Volvo VHD model, 2008 and 2009 Volvo VHL model, 2008 and 2009 Volvo VNL model, 2008 Volvo VT model, and 2008 through 2010 Mack CHU, CXU and GU model trucks that were built with certain Meritor WABCO Vehicle Control Systems (Meritor WABCO) ABS Modulator valves fail to meet the requirements of paragraph S5.3.4.1(a) of Federal Motor Vehicle Safety Standard (FMVSS) No. 121, *Air Brake Systems*. VTN and MTI filed appropriate reports pursuant to 49 CFR Part 573, *Defect and Noncompliance Responsibility and Reports*; the original submissions were dated April 30, 2010, and corrected versions were dated May 28, 2010.

¹ Volvo Trucks North America and Mack Trucks, Inc., are both United States corporations that import and manufacture motor vehicles.

Pursuant to 49 U.S.C. 30118(d) and 30120(h) (see implementing rule at 49 CFR Part 556), VTN and MTI have petitioned for an exemption from the notification and remedy requirements of 49 U.S.C. Chapter 301 on the basis that this noncompliance is inconsequential to motor vehicle safety.

Notice of receipt of VTN and MTI's petitions was published, with a 30-day public comment period, on December 8, 2010, in the Federal Register (75 FR 76518). One comment was received from Meritor WABCO, the equipment manufacturer who manufactured the component that is the source of the subject noncompliance. Subsequent to receiving the comment, the NHTSA Office of Vehicle Safety Compliance (OVSC) requested, and NAT provided, information that supplements the data, views and arguments included in the VTN and MTI petitions. To view the petitions, comment and all supporting documents log onto the Federal Docket Management System Web site at: <http://www.regulations.gov/>. Then follow the online search instructions to locate docket number "NHTSA-2010-0160."

CONTACT INFORMATION: For further information on this decision, contact Mr. James Jones, Office of Vehicle Safety Compliance, the National Highway Traffic Safety Administration (NHTSA), telephone (202) 366-5294, facsimile (202) 366-7002.

SUMMARY OF VTN's and MTI's PETITIONS: VTN stated that the affected Volvo VNL, VNM, and VHD model trucks were manufactured

from March 1, 2007 through December 11, 2009. A total of 1,916 affected Volvo trucks were manufactured of which 1,763 were sold in the US.

MTI stated that the affected Mack CHU, CXU and GU model trucks were manufactured from March 1, 2007, through December 11, 2009. A total 1,287 affected Mack trucks were manufactured of which 1,202 were sold in the US.

Only the trucks sold in the United States are the subject of their petition.

VTN and MTI state that the noncompliance is that the quick release service brake function for brakes mounted on the vehicle front steer axle may not activate properly during FMVSS No. 121 brake pressure release certification testing due to an internal component variation in certain Meritor WABCO ABS modulator valves installed on the subject vehicles. As a result, certain vehicles may not comply with the FMVSS No. 121 brake pressure release timing requirement as specified in S5.3.4.1(a).

However, VTN and MTI indicate that they do not believe that this issue has any effect on the ABS performance of the brake system.

VTN and MTI also state that they have taken steps to correct the noncompliance in future production.

VTN and MTI rely on the test report submitted with the petition to support their contention that the described FMVSS

No. 121 noncompliance is inconsequential to motor vehicle safety.

VTN and MTI believe that their petitions, to exempt them from providing recall notification of noncompliance as required by 49 U.S.C. 30118 and remedying the recall noncompliance as required by 49 U.S.C. 30120, should be granted.

NHTSA DECISION:

Background

FMVSS No. 121 establishes performance and equipment requirements for motor vehicles equipped with air brake systems. Paragraph S5.3.4.1(a) of FMVSS No. 121, requires in pertinent part that;

With an initial service brake chamber air pressure of 95 psi, the air pressure in each brake chamber shall, when measured from the first movement of the service brake control, fall to 5 psi in not more than 0.55 second in the case of trucks and buses;...

To minimize excessive brake drag, the requirement limits the time for pressurized air to exhaust from the service brake chamber after the service brakes have been released. For vehicles equipped with conventional S-cam foundation brakes, the brake linings release from the drums as pressurized air exhausts from the service brake chambers. Typically, heavy-duty vehicle manufacturers have met the requirement by installing a quick release valve in the front (steer) axle control line, between the left and right ABS modulator valves. The subject Volvo and

Mack trucks have ABS modulator valves which have an integrated quick release function to allow rapid exhaustion of air pressure from the front axle brake chambers. In faulty valves, the quick release function does not operate as intended causing slow exhaustion of pressurized air from the brake chambers and consequently slow pneumatic release times. Pneumatic release timing test results provided by NAT show that a tractor equipped with a faulty valve took 0.98s for pressurized air inside the brake chamber to fall from 95 psi to 5 psi versus 0.55s as required.

Poor pneumatic timing could affect brake performance. For example, if a vehicle's wheels lock as the driver is attempting to stop, the vehicle will skid. If the driver is to regain control of the vehicle, immediate release of the brakes is necessary². Additionally, poor pneumatic timing could cause the brakes to drag and cause premature wear of the brake linings. Under certain conditions, excessive brake drag could contribute to heat build-up within the foundation brake assembly resulting in degradation of braking power, particularly in cases in which the driver repeatedly applies the vehicle's brakes to reduce speed while traveling down an extended slope.

² 56 FR13785

Subsequent to submitting the VTN and MTI petitions, NAT provided test data and analyses³ to evaluate the effect of the faulty valves on various aspects of the vehicle's braking performance. The tests and analyses were performed by an independent test lab, Link Commercial Vehicle Testing (Link) and Mr. Richard Radlinski. Based on the test results, NAT has drawn the conclusion that there is no degradation of the brake performance of subject noncompliant vehicles and no negative impact on vehicle safety.

The Problem - Faulty Meritor Wabco ABS Modulator Valve

The noncompliance is caused by a faulty quick release service brake function that may not activate properly to release air pressure from the brake chamber in the time specified by FMVSS No. 121. The quick release function is integral to Meritor WABCO's ABS modulator valve. In brake system designs other than the subject vehicle's, a separate quick release valve placed between the front steer axle's left and right ABS modulator valves, performs the quick release function.

According to NAT, when the modulator valve was retooled due to a supplier sourcing change, the case surface was not adequately controlled within tolerance. As a result, the required internal pressure differential within the valve does not develop as quickly as it should and air does not exhaust, or

³ Requested by NHTSA's Office of Vehicle Safety Compliance (OVSC) by letter dated June 6, 2011

exhausts slowly, through the valve's exhaust port. This leads to increased brake release times. Brake actuation, however, is not adversely affected.

Link/Radlinski Test Data

A. Release Timing Tests

Link conducted timing tests to illustrate the difference between release times of noncompliant and compliant systems with and without ABS operational. The static timing tests were conducted on a 4x2 Volvo tractor's front steer axle equipped with a properly functioning ABS modulator valve (i.e., fast valve). To achieve the noncompliant system, Link replaced the good valve with a faulty one (i.e., slow valve).

To simulate braking conditions without ABS operational, Link followed OVSC compliance test procedure (OVSC TP) protocol. To simulate braking conditions with ABS operational, Link first filled the air brake chamber to 95 psi. Then, Link manually activated the ABS modulator solenoid valve (ABS control system was disconnected) to the "open" position and measured how long it took for the air to exhaust down to 5 psi through exhaust ports controlled by the modulator valve.

Without ABS operational, the compliant system had average release times of 0.36s and 0.37s, for left and right brake chambers respectively, comfortably below the FMVSS No. 121 requirement of 0.55s. However for the noncompliant system, the

release times were much higher and well above the FMVSS No. 121 requirement at 0.91s and 0.98s, for left and right brake chambers, respectively.

With ABS operational, release times were all below 0.20s for both compliant and non-compliant systems. As noted by Link, these results may not fully represent actual release times that would occur during a real ABS braking event because the electronic control unit's (ECU) activation of the ABS modulator valve was bypassed.

B. Road Tests

Link conducted four different road tests on two Volvo tractors to illustrate differences in the dynamic braking performance of noncompliant vehicles when compared to compliant vehicles. One tractor was equipped with a single rear axle (i.e., 2009 Volvo VNM 4x2) and the other with a dual rear axle and lift axle (i.e., 2007 Volvo VT 8x4). To simulate the noncompliant system configuration, Link lengthened the brake control line from the brake pedal to the front axle's modulator valves.

1. Fully Loaded Vehicle - 60 mph stopping distance tests (ABS operational)

These tests generally followed OVSC TP protocol. Both tractors, loaded to gross vehicle weight rating (GVWR) using an un-braked control trailer, were stopped on dry pavement from an

initial speed of 60 mph. There was no significant difference in the average stopping distances of noncompliant vehicles when compared to compliant vehicles.

2. Unloaded Vehicle (Bobtail) - 500 ft., wet Jennite (low friction surface), 30 mph, Braking-in-a-curve tests (ABS operational)

These tests also generally followed OVSC TP protocol. Additionally, Link measured the stopping distances during each run. The results show that the differences in performance between noncompliant and compliant configurations were insignificant.

3. Repeated brake Snubs - Simulated heat build-up tests (ABS operational)

The results show no significant rise in brake lining temperatures for the noncompliant configuration when compared to the compliant configuration.

4. Unloaded and Fully Loaded - 500 ft., wet Jennite, 30 mph, Braking-in-a-curve tests (ABS Failure Modes)

The results were inconclusive. Noncompliant configurations performed better than compliant configurations during some stops and not as good as compliant configurations during other stops. Link attributed the confounding results to variability in the friction level of the wet Jennite surface during the tests.

Summary and Conclusion

The vehicle manufacturer installed faulty ABS modulator valves on the front steer axle of subject vehicles. The faulty valves were not manufactured within engineering specifications and do not rapidly release pressurized air from brake chambers as required. Laboratory test data results and analyses submitted by the vehicle manufacturer demonstrate the following:

1. When simulating severe braking events which require ABS activation, noncompliant vehicles would meet the pneumatic release time requirement because pressurized air in the brake chamber quickly exhausts through the valve via ports controlled by ABS modulators.
2. There is no significant difference in stopping distances of noncompliant vehicles when compared to compliant vehicles during 60 mph panic stops.
3. There is no significant difference in stopping distances or vehicle stability of noncompliant vehicles when compared to compliant vehicles during 30 mph braking-in-a-curve tests.
4. There is no significant rise in brake lining temperatures of noncompliant vehicles when compared to compliant vehicles during repeated brake stops at 30-70 psi application pressures.

NHTSA has concluded that the test data results and analyses are sufficient to grant the petition for the specific conditions that cause the subject vehicles to be out of compliance with the standard's pneumatic release time requirement.

NHTSA emphasizes that in the case of the subject vehicles, only the failure of the release timing to meet the exact timing requirement for the brakes mounted on the steer axles of the subject truck tractors is at issue. The release timing requirements for the drive axles and for the trailer brake control line output coupling of the subject vehicles were not affected by this noncompliance and were not considered under this grant. NHTSA considers brake release timing to be an important element of FMVSS No. 121 requirements, because in the event a non-ABS trailer is being towed, the driver is able to quickly release the brakes of any locked wheels to restore vehicle control and maintain yaw stability. Also, the release timing requirements ensure that brakes on certain axles of a vehicle combination (steer, drive, or trailer) do not excessively drag such that during repeated brake applications they become overly heated. The subject petition is granted solely on the demonstration by petitioner, comparing compliant and noncompliant vehicles, that the noncompliance in the subject vehicles does not create a significant safety risk. It is

important that all other vehicles subject to these requirements continue to meet them.

In consideration of the foregoing, NHTSA concludes that VTN and MTI have provided sufficient information to indicate that the subject FMVSS No. 121 noncompliance is inconsequential to motor vehicle safety. Accordingly, VTN and MTI's petition is granted and the petitioner is exempted from the obligation of providing notification of, and a remedy for, the subject noncompliance under 49 U.S.C. 30118 and 30120.

NHTSA notes that the statutory provisions (49 U.S.C. 30118 (d) and 30120(h)) that permit manufacturers to file petitions for a determination of inconsequentiality allow NHTSA to exempt manufacturers only from the duties found in sections 30118 and 30120, respectively, to notify owners, purchasers, and dealers of a defect or noncompliance and to remedy the defect or noncompliance. Therefore, this decision only applies to the subject vehicles that VTN and MTI no longer controlled at the time that they determined that a noncompliance existed in the subject vehicles.

Authority: (49 U.S.C. 30118, 30120: delegations of authority at CFR 1.50 and 501.8)

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Nancy Lummen Lewis
Associate Administrator
for Enforcement

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